

Student Worksheet

Name(s): _____

Section: _____
Date: _____

Simple Machines

Activity 3 : Screw and Wheel and Axle

1. If this inclined plane moves 3 mm to the left, how high will it lift the object?
2. How do you predict the force applied to the resistance compares to the force you must apply to the screw?

Data Collection

- Record the effort force, the distance lifted and the thread density for 5 tests.

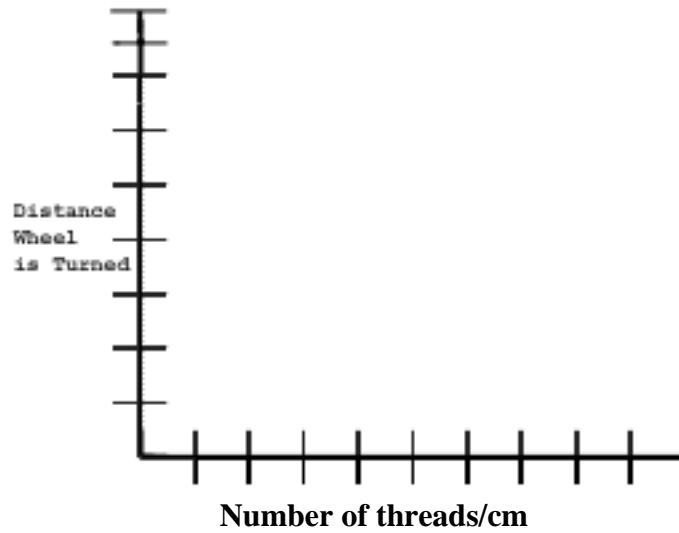
Table 1

[illegible]

Graphing

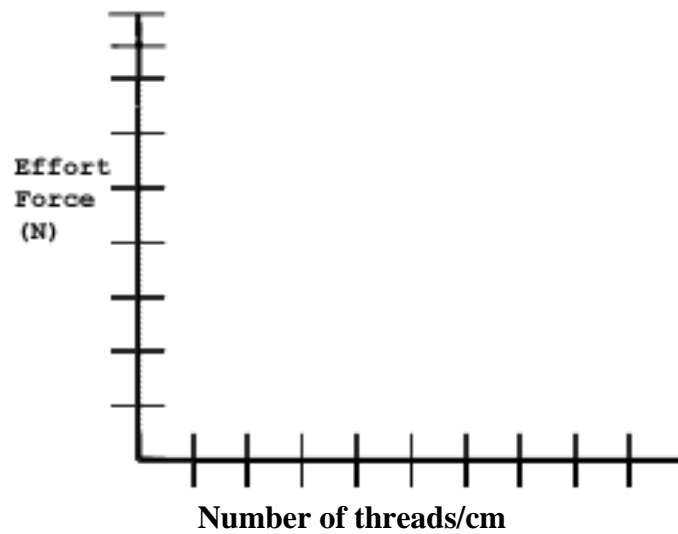
4. Use the data from Table 1 to complete these graphs.

Graph A



5. As the number of threads per centimeter increases what happens to the distance the wheel is turned to lift the gate?

Graph B



6. As the number of threads per centimeters increases, what happens to the amount of force needed to turn the wheel?
7. Discuss the relationships shown on graphs A and B with your partner. In your own words explain how an increase in thread density changes the distance the wheel is turned and the amount of effort force needed to lift the slab. Be sure to use complete sentences.

Wheel and Axle

8. With your partner, list as many possible reasons why they used a wheel to turn the screw instead of a screwdriver.
9. With your partner predict what changes might occur when you adjust the wheel's radius. Record your predictions.

Data Collection

10. Record the effort applied, distance the wheel is turned and wheel radius on Table 2 for each of your tests.

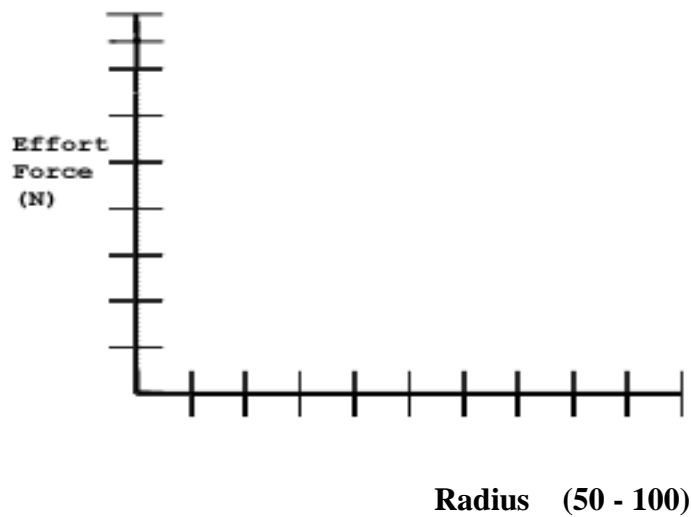
Table 2

Effort Force	Distance Turned	Wheel Radius

Graphing

11. Use the data from Table 2 to complete graph C.

Graph C



12. What happens to the effort force as the radius increases? Use complete sentences.

13. Compare these results with your predictions. Use complete sentences.
14. If an increase in the length of an effort arm results in a decrease in the effort force, explain why an increase in the radius of a wheel results in a decrease in effort force needed.
15. As the radius of the wheel increases, what happens to its circumference? How does this change the distance the handle moves to make one full rotation?
16. What would you gain if you applied the effort force at the axle instead of at the outside of the wheel?

Machines in Combination

Discuss with your partner. You have seen that adjusting thread density will change the amount of effort force needed and adjusting the wheel radius will also change the amount of effort force needed.

17. Explain in your own words the advantage of combining these two simple machines. Use complete sentences.

Challenge:

Predict 3 different combinations of thread density and wheel radius which will allow the gate to be lifted using the same effort force.